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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,659	06/23/2005	Koji Moriuchi	10873.1716USWO	5389

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EXAMINER	
FREEMAN, JOHN D	

ART UNIT	PAPER NUMBER
1794	

MAIL DATE	DELIVERY MODE
01/26/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/540,659	MORIUCHI ET AL.	
	Examiner	Art Unit	
	John Freeman	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 November 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *18-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10 November 2008 has been entered.

Specification

2. The disclosure is objected to because of the following informalities: Table 5 on p24 appears to have incorrect headings:

	Monomer		Additive (mass parts)
	Acid anhydride component (molar ratio)	Diamine component (molar ratio)	
Working Example 7	4,4-DDS(100)	BPDA/BPADA(90/10)	γ-butyrolactone (214)

4,4'-DDS is the diamine component, and BPDA/BPADA is the acid anhydride component.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 18-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choi et al. (US 5,554,684) in view of Peters et al. (US 4,965,337), Hawley's Condensed Chemical Dictionary (14th Edition), and Matsumoto et al. (US 6,100,365).

5. Regarding claim 18:

6. Choi et al. (hereafter Choi) disclose a polyimide precursor composition (col 1 ln 33-62). Polar solvents are used, such as NMP (col 2 ln 4-20). Choi teaches a combination of aromatic dianhydrides can be used (col 2 ln 27-31), including BPDA (col 2 ln 47) and BPADA (col 2 ln 62). The diamine can be 4,4'-DDS (col 3 ln 29-30).

7. Choi is silent with regard to the molar ratio of the dianhydrides.

8. It has long been an axiom of United States patent law that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation. *In re Peterson,* 315 F.3d 1325, 1330 (Fed. Cir. 2003) ("The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages."); *In re Boesch,* 617 F.2d 272, 276 (CCPA 1980) ("[D]iscovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art."); *In re Aller,* 220 F.2d 454, 456 (CCPA 1955) ("[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."). "Only if the 'results of optimizing a variable' are 'unexpectedly good' can a patent be obtained for the claimed critical range." *In re Geisler,* 116 F.3d 1465, 1470 (Fed. Cir. 1997) (quoting *In re Antonie,* 559 F.2d 618, 620 (CCPA 1977)).

9. See Peters et al. (hereafter Peters) which compares BPDA/SDAN and BPADA/SDAN polyimides. SDAN stands for 4,4'-sulfonyl dianiline, equivalent to 4,4'-DDS. Peters notes the two polymers have different glass transitions temperatures and solvent-resistance properties (col 13 ln 5-23). The examiner reasonably concludes, therefore, that an artisan of ordinary skill would recognize that using the dianhydrides as comonomers, as taught by Choi, would require optimization to achieve an acceptable balance between glass transition temperature, which affects *inter alia* processing properties, and solvent resistance. At the time of the invention, it would have been obvious to one of ordinary skill in the art to vary the ratio of the dianhydrides, including over the broad range claimed by Applicant, to balance these properties.

10. Choi is silent with regard to the addition of a cyclic compound as claimed.

11. Propylene carbonate is a well-known plasticizer. See Hawley's Condensed Chemical Dictionary (14th Edition) description of propylene carbonate. At the time of the invention, it would have been obvious to one of ordinary skill in the art to add propylene carbonate as a plasticizer to the polyimide precursor to create a polymer that has better flexibility, and also prolong the time before said polymer becomes brittle.

12. Also γ-butrolactone was a well-known organic polar solvent suitable for use with polyimide precursors. As exemplified by Matsumoto, it was well-known to one of ordinary skill that multiple solvents, such as NMP and γ-butrolactone, could be used together (col 6 ln 36-54). At the time of the invention, it would have been obvious to one of ordinary skill in the art to include multiple polar solvents, including γ-butrolactone, to arrive at a precursor having the desired level of dissolution and concentration.

13. Regarding claim 19:

14. The precursor solution contains 5-20% by weight of solids (col 5 ln 2-4). Changing these values to 100 mass parts, results in the solvent being in the range of 400-1900 mass parts.

15. Choi is silent with regard to the loading of the propylene carbonate. As noted above, it has long been an axiom of United States patent law that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation. At the time of the invention, it would have been obvious to one of ordinary skill in the art to vary the loading of the plasticizer to arrive at a suitable degree of plasticity in the final polymer.

16. Regarding claim 20:

17. Choi is silent with regard to the addition of the propylene carbonate after oligomerizing the polyamic acid.

18. An artisan of ordinary skill would recognize that the timing of the addition of the plasticizer would not be crucial to practicing Choi's invention, and therefore could be added at nearly any time. However, one of ordinary skill would also recognize the reactive carbonyl of propylene carbonate could interfere with the imidization process. Therefore at the time of the invention, it would have been obvious to one of ordinary skill in the art to add the propylene carbonate after partially imidizing, i.e. oligomerizing, the polyamic acid to ensure proper partial imidization.

19. Regarding claim 21:

20. Choi cures the precursor into a polyimide coating (col 6 ln 58-62).

21. Regarding claims 22-24:

22. The examiner takes the position that the polyimide of Choi in view of Peters and Hawley intrinsically has the transmittance, glass transition temperature, and water-absorption properties as presently claimed because it is the same polyimide as presently claimed.

23. Regarding claims 25-29:

24. Choi teaches the coating can be applied to silicon nitride (col 6 ln 58-62). Wafers, or films, of such materials are often used in the electronic industry. The examiner takes the position that a silicon nitride film has the presently claimed conductive properties because it is the same as used in the present invention.

Claim Rejections - 35 USC § 112

25. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

26. Claim 20 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claim recites the polyimide precursor is formed by "oligomerizing" polyamic acid. Applicant notes p15, lines 22-28 for support for the "oligomerizing" language. While the examiner agrees the specification reports a viscosity change, the specification does not provide support for the term "oligomerizing".

Response to Arguments

27. Applicant's arguments with respect to claims 18-29 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Moriuchi JP '946 discloses polyimides made from BPDA, BPADA, and DDS, but is unavailable as prior art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Freeman whose telephone number is (571)270-3469. The examiner can normally be reached on Monday-Friday 7:30-5:00PM EST (First Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on (571)272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

John Freeman
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